SECTION A (40 Marks)

*Compulsory: Attempt **all** questions.*

Question 1

(a) Directions: For each question, there are four alternatives A, B, C and D. Choose the correct alternative and circle it. Do not circle more than ONE alternative. If there are more than one circled, NO score will be awarded. **[15]**

(i) 1 Kgf is equal to

A 9.8N.
B 98N.
C 980N.
D 9800N.

(ii) What energy transformation takes place in a steam engine?

A Mechanical energy to heat energy
B Heat energy to mechanical energy
C Electrical energy to heat energy
D Heat energy to electrical energy

(iii) Forearms belong to class

A I lever.
B II lever.
C III lever.
D IV lever.

(iv) The following are the defects of a simple barometer ***EXCEPT***

A it is portable.
B a scale cannot be fixed on it.
C it does not give accurate reading.
D it has no protection for the glass tube.

(v) The working of a common hydrometer is based on

A Pascal's law.

B law of floatation.

C law of liquid pressure.

D Newton's third law of motion.

(vi) Which one of the following substance has the highest refractive index?

A Ordinary glass

B Diamond

C Alcohol

D Water

(vii) What will happen to the mass number if a radioactive substance emits an alpha particle?

A Increases by 4

B Decreases by 2

C Increases by 2

D Decreases by 4

(viii) From a power station, the power is transmitted at very high voltage because

A it is generated only at high voltage.

B electricity at high voltage is less dangerous.

C it is cheaper to produce electricity at high voltage.

D there is less loss of energy in transmission at high voltage.

(ix) A 4Ω resistor is connected parallel with two 2Ω resistors in series. The total equivalent resistance will be

A 2Ω.

B 3Ω.

C 4Ω.

D 5Ω.

(x) Real image can be differentiated from a virtual image because real mage is

A always inverted and virtual image is always erect.

B always erect and virtual image is always inverted.

C formed behind the screen and virtual image is formed on the screen.

D formed by a concave lens and virtual image is formed by a convex lens.

(xi) The unit of resistivity is

A Ω.

B Ωm.

C Ωm^2.

D Ωm^3.

(xii) What is the distance required to hear an echo?

A 17mm

B 17cm

C 17m

D 17km

(xiii) Which radiation is used for producing vitamin D in plants and animal food?

A X-rays

B Gamma rays

C Infrared rays

D Ultraviolet rays

(xiv) Heat loss due to radiation in a calorimeter is prevented by

A polishing the inner surface.

B polishing the outer surface.

C covering with wool.

D using a wooden lid.

(xv) 'A fuse is rated 10A'. What does it mean?

A It will not work if current is less than 10A.

B It will melt if current exceeds 10A.

C It will work only if current is 10A.

D It has a resistance of 10Ω.

(b) Fill in the blanks by writing suitable words. **[5]**

(i) If the angle between direction of force and displacement is 180°, the work done is …… .

(ii) The distance between the optical centre and the principle focus of a lens is called …… .

(iii) The energy released by an electric oven, which draws a current of 10A at 220V for half an hour is …….. …….. .

(iv) Radio frequency transformers are used in …….. .

(v) Specific latent heat of fusion of ice is ……. .

(c) Match each item under Column A with the most appropriate item in Column B. Rewrite the correct matching pairs in the space provided. **[5]**

Column A	Column B
1. Magenta	(a) eye lid
2. Dioptre	(b) voltmeter
3. Shutter	(c) red + blue
4. Current	(d) power of a lens
5. Electron	(e) Alpha particle
	(f) pupil
	(g) red + green
	(h) ammeter
	(i) beta particle

……

……

……

……

……

(d) Correct the following statements by changing the BOLD word/s ONLY. Rewrite the correct word/s ONLY. **[5]**

(i) The mechanical advantage of a single movable pulley is **1.**

……

(ii) The atmospheric pressure **increases** with increase in altitude.

……

(iii) The amount of light focused at any point depends on the **focusing** of the camera.

……

(iv) The unit of loudness is **newton**.

……

(v) When the angle of incident is equal to critical angle, the angle of refraction is **80°**.

……

(e) Answer the following questions:

(i) Which is a better way to produce electricity, using radioactive substance or water? Justify your answer with appropriate reasons. **[2]**

……

……

……

……

……

……

(ii) Why do wise farmers water their fields in the evening when the weather forecast is frost? **[2]**

……

……

……

……

(iii) Write ***one*** difference between damped vibration and forced vibration with an example each in the table given below. **[2]**

Damped vibration	Forced vibration

(iv) A cork weighs 20gf in air and 15gf when completely immersed in petrol. **[2]**

1. Calculate the upthrust.

2. Calculate the relative density of the cork.

(v) Define current and give its mathematical expression. **[2]**

……

……

……

……

……

SECTION B (40 Marks)

*Attempt **any four** questions.*

Question 2.

(a) Write down any ***two*** factors affecting upthrust. **[2]**

……

……

……

……

(b) You have shifted to a new house which has a geyser and heater facilities. If you operate a geyser rated 1000W for 3 hours daily and a heater rated 400W for 6 hours daily, calculate the monthly bill for running the geyser and the heater if the energy cost is Nu. 2 per KWh. **[2]**

(c) Write down ***two*** differences between a step-up transformer and a step-down transformer in the table given below. **[2]**

Step-up transformer	Step-down transformer

(d) State the following laws: **[2]**

1. Law of inertia

……

……

……

……

2. Law of conservation of energy

……

……

……

……

……

(e) Write down the functions of the following parts of a cathode ray tube. **[2]**

1. Cathode

……

……

2. Anode

……

……

3. X-plate

……

……

4. Fluorescent screen

……

……

Question 3.

(a) Read the following statements.

I. Ice cream appears colder to the mouth than water at 0^0c.

II. Soft drinks are more effectively colder by ice cube than iced water.

III. Steam at 100^0 c produces severe burns than boiling water at 100^0 c

IV. Water from soil does not evaporate quickly by the heat of the sun.

What property of

(i) ice is described by the above statements I and II? **[1]**

……

……

(ii) steam is described by the above statements III and IV? **[1]**

……

……

(b) Calculate the heat given out when water of mass 60g is cooled from 90°C to 40°C. **[2]**

(c) 'The weight of a body is not constant but varies with its position'. Why? Give reasons to support your answer. **[2]**

……

……

……

……

……

……

(d) (i) State Snell's law. **[1]**

……

……

……

……

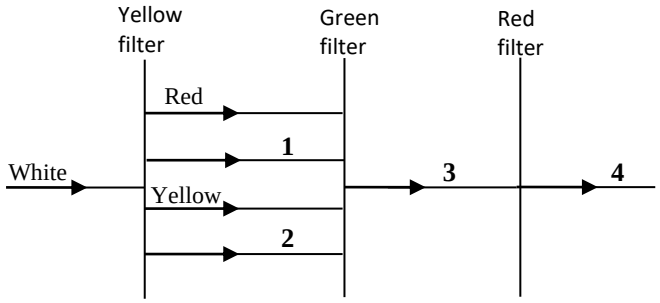
(ii) Write any ***two*** characteristics of an image formed by a magnifying glass. **[1]**

……

……

……

(e) In the diagram given below, label 1, 2, 3 and 4. **[2]**



……

……

……

……

Question 4.

(b) An object is placed in front of a lens between F_1 and $2F_1$. The image formed is real, inverted and magnified. **[2]**

1. Name the lens.

……

2. Draw a ray diagram to show the formation of an image with the characteristics given above.

(a) What causes electrical resistance? **[2]**

……

……

……

(c) Bhutan Power Corporation is planning to increase the rate per KWh of the electrical energy consumed at home. Electricity or cooking gas, which would you prefer to use for cooking? Justify your answer with reasons. **[2]**

……

……

……

……

……

(d) The momentum of a body of mass 4kg is 20kgm/s. How much kinetic energy does the body possess? **[2]**

(e) Why do dogs usually bark at night? **[2]**

……

……

……

……

……

Question 5.

(a) State the principle on which a D.C. motor works. **[2]**

……

……

……

……

……

……

(b) If the angle of incidence in water of refractive index1.3 is 30°, calculate the angle of refraction. **[2]**

(c) A cork floats while a nail sinks in a liquid. Why? **[2]**

……

……

……

……

(d) (i) Light bends when it travels from one medium to another medium. Why? **[1]**

……

……

(ii) Why is a convex lens known as a converging lens? **[1]**

……

……

(e) Derive the relation between heat capacity and specific heat capacity. **[2]**

Question 6.

(a) Define the following: **[2]**

1. Specific latent heat of fusion

……

……

……

……

2. Specific latent heat of vapourisation

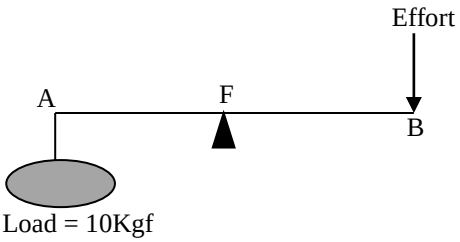
……

……

……

……

(b) The following figure shows the use of a lever. **[3]**



1. Name the class of lever and give an example.

……

2. If AF is 10cm and FB is 10cm, find its mechanical advantage.

3. Calculate the effort.

(c) Give reason for the following: **[1]**

(i) An alpha particle is also known as helium.

……

……

(ii) A beta particle is also known as electron. **[1]**

……

……

(d) (i) What do you understand by potential difference? **[1]**

……

……

……

……

(ii) Write ***two*** characteristics of high tension wires. **[1]**

……

……

……

(e) Why gamma rays are used in the treatment of cancer? **[1]**

……

……

……

……

Question 7.

(a) (i) What do you understand by radioactivity? **[1]**

……

……

……

(ii) Who discovered radioactivity? **[1]**

……

(b) Standing between two walls, Dorji fires a gun and hears two successive echoes at 2s and 4s. Calculate the distance between the two walls. (Speed of sound=340m/s) **[2]**

(c) Write ***two*** differences between resistors in series and in parallel in the table given below. **[2]**

Resistors in series	Resistors in parallel

(d) Write ***one*** use of the following: **[2]**

1. Altimeter

……

……

2. Hydraulic jack

……

……

(e) If you wanted to buy a camera, which camera would you prefer, a digital camera or a film used camera. Support your answer with reasons. **[2]**

……

……

……

……

……

……

……

……

for Rough Work

for Rough Work

for Rough Work